1.2.4 Expansion table

All materials used in manufacturing the pipe expand when they warmed and shrink when they cool down. So, account must always be taken of length differences as a result of variations in temperature. The temperature difference and the length of the pipe are the two parameters that will determine the change in length. This can be calculated using the following table.

Expansion (mm/m)	Temperature difference (ΔT)							
Pipe length (m)	10	20	30	40	50	60	70	80
1	0,25	0,50	0,75	1,00	1,25	1,50	1,75	2,00
2	0,50	1,00	1,50	2,00	2,50	3,00	3,50	4,00
3	0,75	1,50	2,25	3,00	3,75	4,50	5,25	6,00
4	1,00	2,00	3,00	4,00	5,00	6,00	7,00	8,00
5	1,25	2,50	3,75	5,00	6,25	7,50	8,75	10,00
6	1,50	3,00	4,50	6,00	7,50	9,00	10,50	12,00
7	1,75	3,50	5,25	7,00	8,75	10,50	12,25	14,00
8	2,00	4,00	6,00	8,00	10,00	12,00	14,00	16,00
9	2,25	4,50	6,75	9,00	11,25	13,50	15,75	18,00
10	2,50	5,00	7,50	10,00	12,50	15,00	17,50	20,00

The expansion table is drawn up based on the formula:

$$\Delta L = L \times \alpha \times \Delta T$$

With: ΔL = change in length
L = pipe length
α = coefficient of expansion
ΔT = temperature difference

where the coefficient of expansion amounts to 0.025 mm/mK irrespective of the diameter of the pipe.

Example:

Given: L = *8 m*
α = *0,025 mm/mK*
ΔT = *50°C (at Tmin=20°C and Tmax=70°C)*

Asked: ΔL

Solution: *Consult the expansion table or apply the formula.*

Table: ΔL = *10,0 mm*

Formula: $\Delta L = L \times \alpha \times \Delta T$
$\Delta L = 8 \times 0{,}025 \times 50$
ΔL = *10,0 mm*

The expansion of the pipe must be considered when designing an installation.